

**HULEECHIUS, A NEW GENUS OF RIFFLE BEETLES  
FROM MEXICO AND ARIZONA  
(COLEOPTERA, DRYOPOIDEA, ELMIDAE)**

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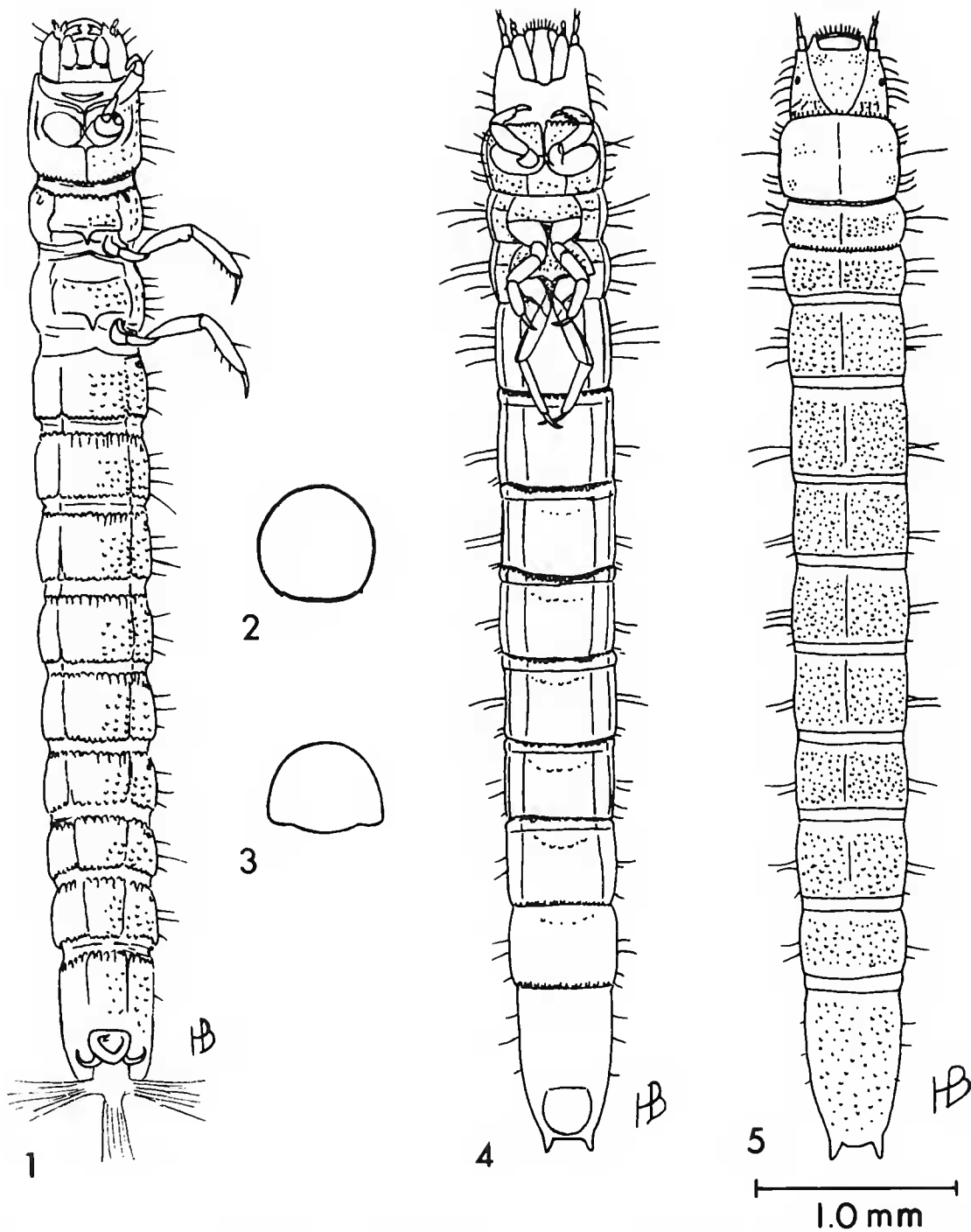
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The southern portion of the Mexican state of Baja California is quite arid, as is most of the peninsula. Something of an oasis amid the typical thorn and cactus scrub of the area is the small village of Caduaño, which is located some 30 km from San José del Cabo and 15 km below the Tropic of Cancer. Caduaño boasts several modest springs, only one of which produces more than a mere trickle of water. At least, such was the case during my visits to the site in the summers of 1973 and 1974. The largest spring (or cluster of springs) gave rise to a stream about 30-50 cm wide, 2-5 cm deep, and less than 30 m in length, ending in a small impoundment. The substrate was sand and fine gravel, with an occasional larger pebble. In 1973 the stream was completely overgrown, chiefly by bamboo or "river grass," which, in turn, was overhung by palms and other trees. Access to the stream was at an inconspicuous watering place just above the impounded pool, shared by people and cattle. To collect in the stream I had to stoop—almost to crawl—in the tunnel of vegetation.

The water was crystal clear and cool, and swarmed with amphipods. The only dryopoid beetles I found were blackish elmids ranging from 2.25 to 2.75 mm in length and their larvae, which were yellowish brown, subcylindrical, and about 6 mm in maximum length—very much like tiny elaterid wireworms. The larvae caught my attention. I thought them to be those of *Cylloepus*, and was delighted to find them relatively abundant, for in my 10 years of tropical collecting I had gotten *Cylloepus* larvae only once (in Bolivia) despite the numbers of assorted adults from scores of localities (Brown, 1977).

Later, when I had time and facilities to examine my preserved material, I was not disappointed. But the larvae were not those of *Cylloepus*, though they bear a close superficial resemblance, as do the adults. The combination of larval and adult features indicated that this population represented a genus not previously described.

In June of 1974 I returned to Caduaño with the hope of obtaining pupae of the new genus and of gaining more information concerning the ecology and life history of this population. To my dismay, the habitat had been



Figs. 1-5. Fig. 1. *Cylloepus parkeri* Sanderson, ventral aspect of larva. On the prothorax, the pleurites meet midventrally both behind and in front of the coxae. There are no perceptible meso- or metathoracic pleurites. On the abdomen, sterno pleural sutures extend even onto the last segment. Tergopleural sutures are lateral and cannot be seen from this view, but they also extend onto the last segment. Anal gill filaments extended. Fig. 2. *Cylloepus parkeri*, diagrammatic cross-section of larva. Fig. 3. *Huleechius marroni*, n. sp., diagrammatic cross-section of larva. Fig. 4. *Huleechius marroni*, n. sp., ventral aspect of larva. On the prothorax, note median posterior sternite. Each thoracic segment has distinct pleurites and tergo-pleural sutures. On the abdomen, pleural sutures occur only on segments 1-7. Fig. 5. *Huleechius marroni*, n. sp., dorsal aspect of larva.

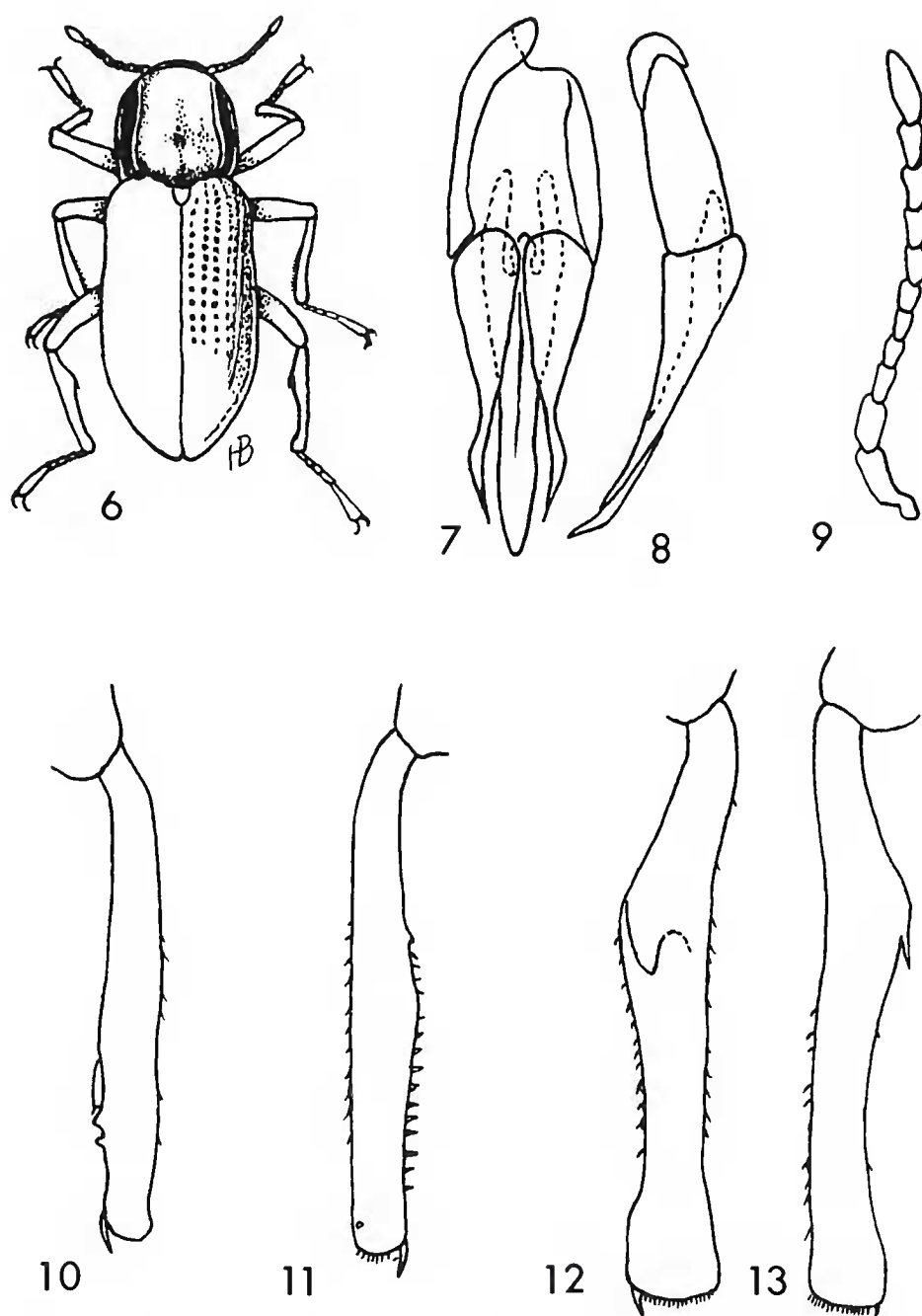
greatly altered. Gone was all the overhanging vegetation. The entire stream course was open and sunlit—and had been thoroughly cleaned out. An hour or two spent examining every little stone in the brook revealed not a single dryopoid, though a number of other groups of aquatic invertebrates were now thriving. Since I have not found specimens of this genus in any other streams of Baja California (though some harbor a reasonable assortment of elmids), it is possible that the genus has been extirpated from the peninsula. For this reason, it seems wise not to designate this local species as type for the genus, but to select one that presumably occupies a less tenuous position. Hinton described such a species in 1934, elaborating upon it in 1940, when he also described what must have been the larvae of his *Cylloepus spinipes*. He had no basis for associating adult with larva, and, quite appropriately, referred to the larva as representing “*Elsianus* (?) sp. ?” In my own collection I find adults of the new genus among unidentified specimens of *Cylloepus*, and larvae among those classified as *Elsianus* or “near *Elsianus*.”

As in the case of *Neocylloepus* (Brown, 1970), I should stress the point that it is the almost certain association of larval type with adult which forces me to conclude that the adults cannot belong to the genus *Cylloepus*. The larva of *Cylloepus* (Fig. 1), first described by Hinton (1940), is unique among elmids in several respects: (1) it lacks tergopleural thoracic sutures; (2) prothoracic pleurites meet in the midventral line posterior to the procoxal cavities as well as anterior to them; (3) mesothoracic and metathoracic pleurites are absent; (4) the first abdominal segment has only sternopleural sutures, but all the remaining abdominal segments have both tergopleural and sternopleural sutures which even extend onto the basal half of the ninth segment, never converging. The larva of the new genus exhibits none of these rather basic features, being quite conventional and resembling very much the larvae of such major genera as *Elsianus* and *Stenelmis*. Prodded by such convincing evidence from the larvae, I have simply had to seek valid characters for separating the adults from those of bona fide *Cylloepus*.

### **Huleechius, new genus**

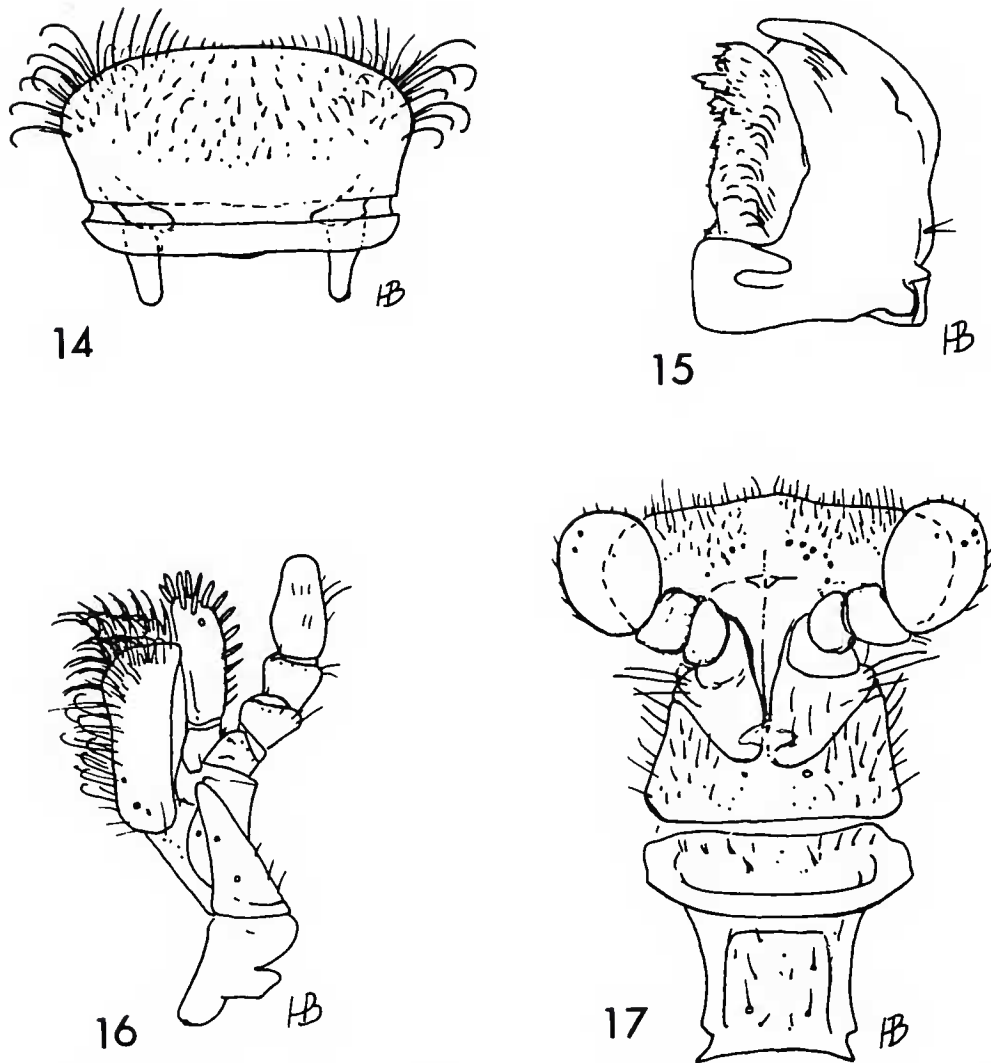
(Figs. 3–34)

*Description.*—*Body* elongate, subparallel. Dorsal surface clothed with short, recumbent hairs. Tomentum on genae, epipleura, sides of thoracic and abdominal sternites (none on hypomera), and legs (except tarsi). *Head* retractile almost to antennal base. Antenna 11-segmented, filiform (Fig. 9). Mandible (Fig. 15) with 3 chisel-like apical teeth; prostheca large, membranous, with spinose apex. Maxilla (Fig. 16) with rather small, 4-segmented palp; stipes with well-developed palpifer; galea and lacinia separate and apex of each spinose. Labium (Fig. 17) with palp 3-segmented; prementum



Figs. 6-13. Fig. 6. *Huleechius marroni*, n. sp., adult male, dorsal aspect. Figs. 7-13. *Huleechius spinipes* (Hinton). 7, Male genitalia, dorsal aspect; 8, same, lateral aspect; 9, antenna; 10, front leg, tibia; 11, middle tibia; 12, hind tibia, inner aspect; 13, same, lateral aspect (all from Hinton, 1940).

with palpiger; mentum and submentum transverse. Gula rectangular, conspicuously narrower than mentum or submentum. *Pronotum* on each side with a sublateral longitudinal carina extending from base to apex; with a median longitudinal impression on disk. *Elytra* striate and punctate; without accessory striae; with 2 sublateral carinae. *Hind wing* (Fig. 19) without radial cross-vein or closed anal cell; cubito-anal cross-vein complete, joining cubitus to remnant of first anal; branches of second anal apparently fused; third anal without a second branch. *Prosternum* (Fig. 18) very long in front of procoxae; prosternal process rather long, with posterior margin rounded.



Figs. 14–17. *Huleechius marroni*, n. sp., adult male. Fig. 14. Labrum. Fig. 15. Mandible. Fig. 16. Maxilla. Fig. 17. Labium and gula.

Mesosternum with a rather deep median groove for the reception of the prosternal process, followed by an impressed line to posterior margin. Metasternum with a median longitudinal impressed line. Abdomen slightly longer than broad, with segments 1 and 5 longest; segment 5 on each side with apicolateral margin curled upward and inward to clasp invaginated epipleural margin of elytron. Legs with visible portions of coxae rounded and trochantin concealed by hypomera; tibiae of male with pronounced secondary sexual characters (Figs. 10–13, 20–22); claws without teeth. *Alimentary canal* with 8 caeca on anterior margin of midgut; hind gut with 6 Malpighian tubules. *Male genitalia* (Figs. 7, 8, 23–25) with basal piece well developed; both penis and parameres long and acute at apex. *Female genitalia* (Fig. 26) with both coxites and styli relatively elongate.

*Type-species*.—*Cylloepus spinipes* Hinton (1934).

*Etymology*.—*Huleechius* is named in honor of Hugh Leech; gender masculine.

*Comparative notes*.—*Huleechius* is close to such genera as *Stenelmis*, *Ordobrevia*, *Cylloepus*, *Hexacylloepus*, and *Elsianus*. In the keys of Hinton

(1940), Leech and Chandler (1956), Leech and Sanderson (1959), Arnett (1963), and Brown (1976), adults of the new genus key out to *Cylloepus*, from which they differ in having the gula distinctly narrower than the submentum or mentum, in lacking vein 3A<sub>2</sub> in the hind wing, in the structure of the male genitalia, and in the nature of the secondary sexual characters of the tibiae of males. *Huleechius* differs from *Stenelmis* and *Ordobrevia* in having hairy tomentum on the anterior tibiae, from *Ordobrevia* and *Elsianus* in lacking an accessory elytral stria between the sutural and second striae, from *Elsianus* in having a median longitudinal impression on the pronotum, and from *Hexacylloepus* in lacking a belt of tomentum across the pronotal hypomeron, in having 8 rather than 6 caeca at the anterior end of the midgut, and in having 6 rather than 4 Malpighian tubules. As mentioned earlier, the larvae of *Huleechius* resemble those of *Cylloepus* only in such superficial features as their very slender, parallel-sided form. They differ from larvae of *Cylloepus* in possessing tergopleural thoracic sutures, a median posterior prosternum, mesothoracic and metathoracic pleurites, and pleural sutures that end on the 7th segment of the abdomen rather than extending all the way to the middle of the 9th segment. The larvae of *Huleechius* are fundamentally very similar to those of *Stenelmis* and *Elsianus* in all the features listed above, as will be discussed in the section dealing with larvae.

#### Key to the Species of *Huleechius*

1. Pronotum with disk distinctly granulate; elytra with intervals virtually flat; size larger (at least 2.8 mm) . . . . . *H. spinipes* (Hinton)  
 Pronotal disk not noticeably granulate; elytral intervals moderately convex; size smaller (less than 2.8 mm) . . . . . 2
2. Uniformly very dark brown to black, or elytra with sutural intervals and sublateral carinae somewhat lighter in color, giving the impression of faint vittae . . . . . *H. marroni* Brown, n. sp.  
 Pronotum darker than elytra, color ranging from light to moderately dark brown; sutural intervals may be darker than rest of elytral disk . . . . . *H. marroni carolus* Brown, n. subsp.

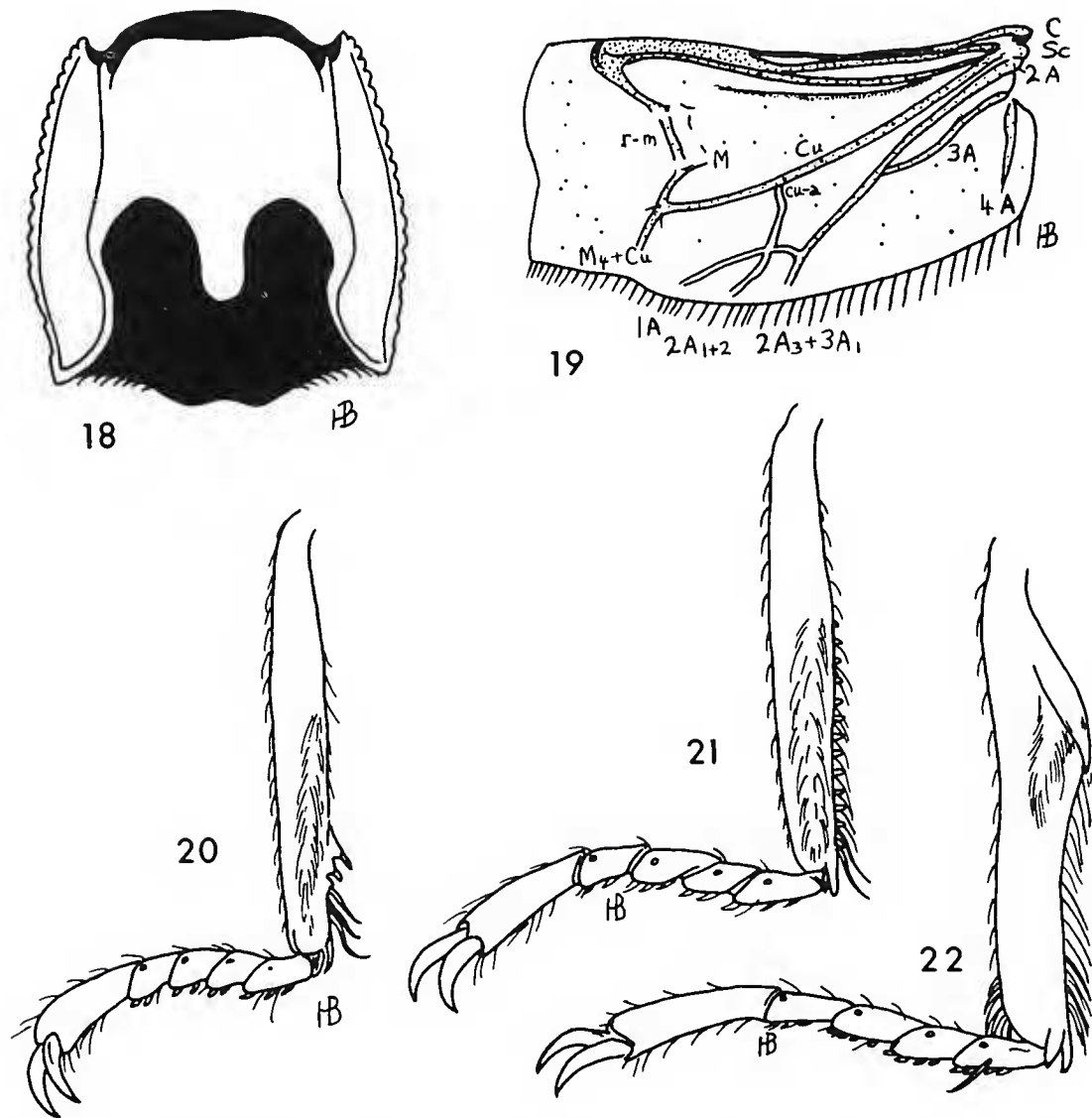
#### *Huleechius spinipes* (Hinton), NEW COMBINATION (Figs. 7–13)

*Cylloepus spinipes* Hinton 1934. Rev. Ent., Rio de J., 4(2):192.

The following description of this, the type-species of the new genus, is taken from Hinton's (1940) redescription of the species, together with the figures he provided.

*Male*.—Length, 3.0–3.4 mm; breadth, 1.1–1.3 mm. Clothed with fine,

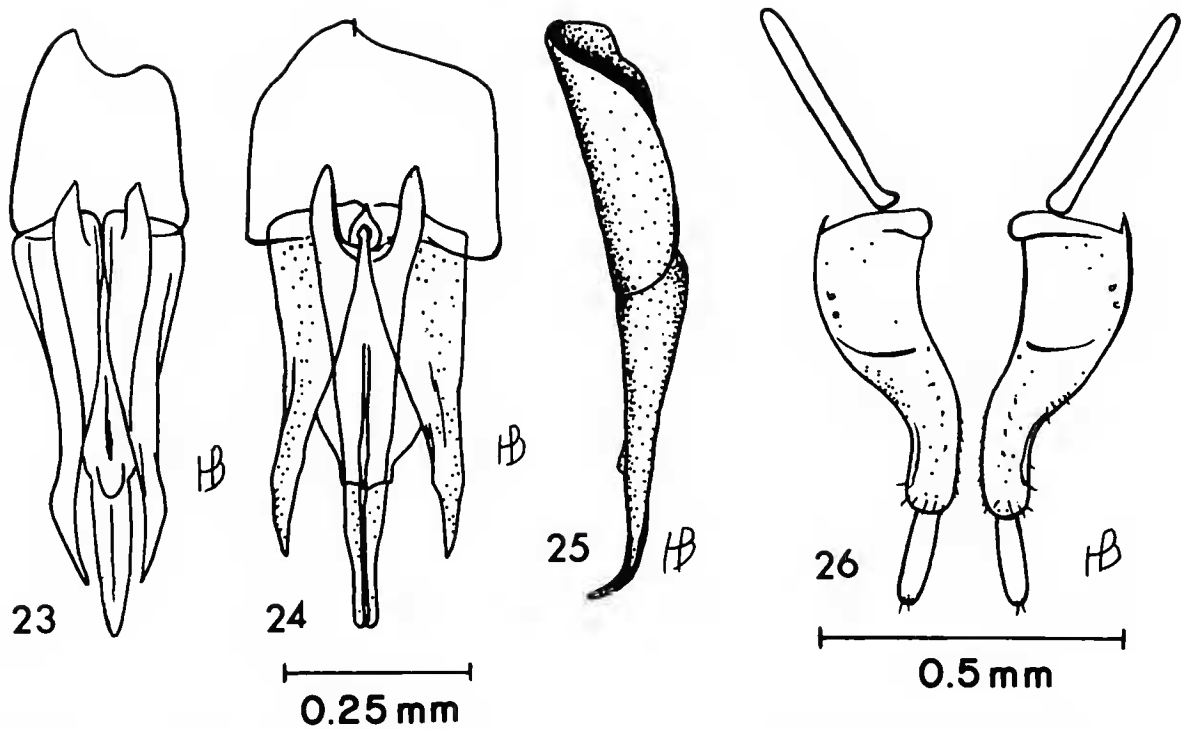
short (about 0.038 mm long), recumbent, brownish-testaceous hairs which arise mostly at intervals equal to slightly less than their lengths; antennae similarly but more sparsely clothed; apical half of labrum clothed with equally fine but much longer (as long as 0.087 mm at sides) and paler hairs which are more erect and much denser. Cuticle shining and for the most part densely alutaceous; piceous to dark rufopiceous; antennae, mouth-parts, and legs paler rufopiceous. Tomentum cinerous with moderate golden reflections. *Head* with a scarcely noticeable, broad, feebly oblique impression which extends shortly on each side near anterior half of eyes. Clypeal suture strongly impressed and feebly arcuate; anterior margin of clypeus very broadly and feebly arcuately emarginate, with the angle on each side obtusely rounded and sides moderately arcuate. Labrum broadly and feebly rounded in front, with the angle on each side broadly rounded. Surface with the alutaceous microsculpture appearing somewhat granulate; with granules which are usually round, slightly coarser than facets of eyes, and usually separated by less than to once their diameters; granules on clypeus similar; labium without granules, apical half punctate with very fine punctures which are usually separated by once to twice their diameters. *Pronotum* at broadest point, which is at basal half, broader than long (1.05:0.97 mm) and base broader than apex (0.96:0.72 mm). Apical margin as seen from above moderately feebly arcuate at middle and deeply sinuate on each side behind eye before apical angle; apical angles acute and strongly produced forwards and very slightly inwards; sides feebly arcuate, more strongly so at basal half, nearly straight at apical fourth and scarcely noticeably sinuate just before basal angles; lateral margins feebly crenate; basal angles feebly acute, nearly rectangular and scarcely produced; base trisinate, broadly and moderately strongly sinuate on each side and shortly and very shallowly sinuate in front of scutellum. *Pronotum* with the sublateral carinae prominent, very slightly converging towards apex, moderately sinuate at basal two-fifths, and extending to apical margin, while the broadest portion of the carinae is from basal fifth to apical fourth. Pronotum also as follows: a very broad and feebly raised portion extends from base to base of disk; on each side of this raised area with a feeble, moderately broad, feebly curved and oblique impression extending to broad, moderately shallow, indefinite impression near sinuation of sublateral carina which when viewed from a nearly lateral position seems to very shallowly extend across sublateral carinae at about middle; median longitudinal impression in some specimens extending from base to basal third as a very shallowly impressed line and in others beginning only at basal third, but in all extending from basal third to about apical third as a navicular, moderately deep impression which is broadest at middle where it is not quite as broad as scutellum. Surface with the alutaceous microsculpture similar but not as evident as that of head; set with round to feebly obovate granules which are nearly twice as coarse as facets of eyes,



Figs. 18–22. *Huleechius marroni*, n. sp., adult male. Fig. 18. Prothorax, ventral aspect. Fig. 19. Hind wing, with venation after Forbes. Fig. 20. Front tibia and tarsus. Fig. 21. Middle tibia and tarsus. Fig. 22. Hind tibia and tarsus.

low (only feebly convex), and are usually separated by slightly less than their own diameters; granules on sublateral carinae coarser and denser; granules anteriorly on disk slightly finer and sparser. *Elytra* more than twice as long as pronotum (2.30:0.97 mm) and feebly broadening to broadest point, which is at apical third, and is here broader than base of pronotum (1.32:0.96 mm). Apices broadly and moderately feebly produced and conjointly broadly rounded. Lateral margins feebly but regularly crenate. Surface striate with the discal striae moderately coarse at base, becoming finer towards apex, and beyond apical fourth obsolete except for sutural; discal strial punctures round to subquadrate and at basal third a third to two-thirds as broad as intervals, separated longitudinally by once to twice their diameters; these punctures are narrower basally and towards apex rapidly become fine and sparse so that at apical eighth they are about a fourth as coarse as those at basal third. Discal intervals nearly flat and subequal in breadth, at base





Figs. 23–26. *Huleechius marroni*, n. sp., adult. Fig. 23. Male genitalia, ventral aspect. Fig. 24. Same, but more flattened beneath cover glass. Fig. 25. Same, but lateral aspect. Fig. 26. Female genitalia.

all except sutural are slightly convex, and of the convex intervals the third is only slightly more so than the others; surface of intervals at base alutaceous somewhat as pronotum, elsewhere much more sparsely and differently alutaceous; on basal fourth set with granules which are similar in size to those of pronotum and similarly distributed; these granules rapidly become sparser so that beyond basal half the disk is free of granules; granules of carinate intervals equal in size and density to those of elytral base. *Scutellum* flat, subovate, broader than sutural interval (0.14:0.10 mm), longer than broad (0.15: 0.14 mm), very feebly and broadly rounded basally, nearly truncate, and at apex narrowly rounded; surface nearly free of granules. *Prosternum* with the process rounded at apex; prosternum and process evenly and moderately depressed, with the anterior two-thirds (not including prosternal process) strongly and abruptly lobed; surface granulate as that of elytral base; hypopleura slightly more sparsely granulate. Mesosternum nearly entirely depressed for the reception of the prosternal process; sides near middle coxae very strongly and broadly raised and at apex with a dozen or less slender, long (about 0.075 mm), erect, brownish-testaceous hairs; surface similar to prosternum but more sparsely granulate. Metasternum with nearly the entire discal region occupied by a deep, transverse, oval depression; posterior margin on edge of each side of middle with a moderately deep and large subtriangular impression; with a broad (0.375 mm broad in specimen 3.0 mm long) and shallow median longitudinal impression which ends rather abruptly at apical fifth and basal seventh; discal surface gran-

ulate similarly to pronotum; sides similarly sculptured but with the granules sparser and extreme sides with the granules very flat. Middle basal portion of first abdominal sternite strongly depressed and sculptured similarly to metasternal disk; ventral sternites elsewhere more sparsely granulate than disk of metasternum and especially sparsely so at middle. Front tibiae with three toothlike structures as figured (Fig. 10). Middle tibiae with a ventral row of teeth (Fig. 11). Hind tibiae with a large, flat, knife-like tooth on inner ventral side at basal two-fifths (Figs. 12, 13). Surface of femora and tibiae granulate similarly to ventral abdominal segments. *Genitalia* as figured (Figs. 7, 8).

*Female*.—Externally similar to male except as follows: (1) sides of mesosternum only moderately convex and without the group of long hairs; (2) disk of metasternum not as broadly nor as strongly depressed; and (3) front and hind tibiae without the toothlike structures and middle tibiae without the row of teeth.

*Type*.—Male in the U.S. National Museum. MEXICO: Dist. de Temascaltepec, Real de Arriba, alt. 6000–7000 ft, May–July 1933 (H. E. Hinton and R. L. Usinger).

*Specimens examined*.—68, with same data as type but a few of these also collected at Temascaltepec, alt. about 5000 ft; 25, as above but collected in June and July, 1934 (H. E. Hinton).

*Variations*.—The only notable variation is that in some specimens the median longitudinal line on the pronotum extends from base to basal third as a very shallowly impressed line, while in others it is absent on basal third and only present from basal third to apical third.

Although the description above is adapted from Hinton (1940), I might add that I have collected a few additional specimens from other localities in Mexico, as follows: also in the state of Mexico, 2 adults from near Ixtapan de la Sal 19/XI/64, and 1 from Cieneguillas 13/VIII/70; 1 from Coahuila near Bella Union 16/VIII/70; 1 from Jalisco s. of Mazamitla 23/XI/64; 1 from Nuevo Leon in the Rio Ramos n. of Linares 8/X/64. The latter two are only 2.8 mm in length, and may actually represent another closely-related species.

### **Huleechius marroni, new species**

(Figs. 3–6, 14–34)

*Holotype*.—Male. Like *H. spinipes* (Hinton) except as follows: length 2.5 mm, width 0.95 mm; pronotum 0.8 mm in length and width, broadest at basal third; elytra 1.85 mm in length, 0.95 mm in width, broadest at or just posterior to middle; antenna 0.7 mm in length, slightly greater than width of head across eyes. Antenna testaceous rather than rufopiceous. Labrum

(Fig. 14) not granulate, with long, pale hairs mostly curved rather than straight. Mandible as figured (Fig. 15). Maxilla (Fig. 16) with galea and lacinia spinose laterally as well as apically; palp small, with apical segment not enlarged. Labium (Fig. 17) with apical segment of palp less flattened and pubescent than in male of *H. spinipes*. Gula square, about half as broad as submentum. Pronotum with granulation inconspicuous. Elytral intervals moderately convex. Hind wings reduced (Fig. 19), proportionately much smaller than in *H. spinipes*. Prosternum (Fig. 18) medially less depressed and less coarsely granulate than in *H. spinipes*. Mesosternum with pale hairs on lateral prominences less conspicuous than in *H. spinipes*. On the tibia of the front leg (Fig. 20), of the inner subapical spines, the first or proximal one differs from that of *H. spinipes* in being less apically directed, but the features of all 3 tibiae (Figs. 20–22) are remarkably similar to the corresponding ones of *H. spinipes* (Figs. 10–13). The male genitalia (Figs. 23–25) are also strikingly similar to those of *H. spinipes*.

*Variations*.—Other males range from 2.15 to 2.65 mm in length and 0.85 to 1.0 mm in width. In some, the sutural intervals and sublateral carinae are slightly paler in color than the rest of the elytra, giving an appearance of faint vittae.

*Females*.—Slightly larger than males (length 2.4–2.75 mm, width 0.9–1.1 mm) and externally similar to males except as in *H. spinipes*. Female genitalia are shown in Fig. 26.

*Types*.—Holotype male: MEXICO: Baja California Sur: spring at Caduaño, Trapiche de Marrón, 28/VII/73, H. P. Brown, deposited in the National Museum of Natural History, Smithsonian Institution. Allotype: same data as holotype, deposited with holotype. Paratypes: 32 with same data as holotype, some deposited in the collection of the California Academy of Sciences, but most in the Stovall Museum of Science and History, Norman Oklahoma.

*Etymology*.—The species is named in honor of Sr. Anselmo Ciro Marrón Alvarez, on whose property the specimens were collected and who graciously conducted me to the site and gave me permission to collect.

*Habitat*.—All specimens were taken from a small, clear, spring-fed brook less than 1 m in width and no more than a few cm in depth, completely shaded by overhanging vegetation. The substrate was sand and rather fine gravel. The surrounding region is quite arid. Caduaño is south of the Tropic of Cancer, just a few miles north of San José del Cabo. No other dryopoid beetles were seen in the stream.

*Comparative notes*.—Members of this species are smaller and less noticeably granulate than those of *H. spinipes*. From specimens of *H. marroni carolus* they differ most conspicuously in their much darker and essentially uniform coloration.

***Huleechius marroni carolus*, new subspecies**

*Holotype*.—Male. Length 2.35 mm, width 0.9 mm. Like *H. marroni* except as follows: pronotum smooth, darker than elytra. Labrum with pale hairs reduced to stubble.

*Variations*.—Other male 2.5 mm in length, 0.95 mm in width.

*Females*.—Slightly larger than males (length 2.6–2.7 mm, width 0.97–1.0 mm) and externally similar to males except as in *H. spinipes*.

*Types*.—Holotype male: ARIZONA: Gila Co. border with Graham Co., in San Carlos River ca. 30 km e San Carlos, 3/VIII/73, H. P. Brown, deposited in Stovall Museum of Science and History, Norman Oklahoma. Allotype: same data as holotype, deposited with holotype. Paratypes: 1 male with same data as holotype, deposited in the National Museum of Natural History, Smithsonian Institution, and 1 female with same data except collected 20/VI/74, deposited in the entomological collection of the University of Arizona, Tucson.

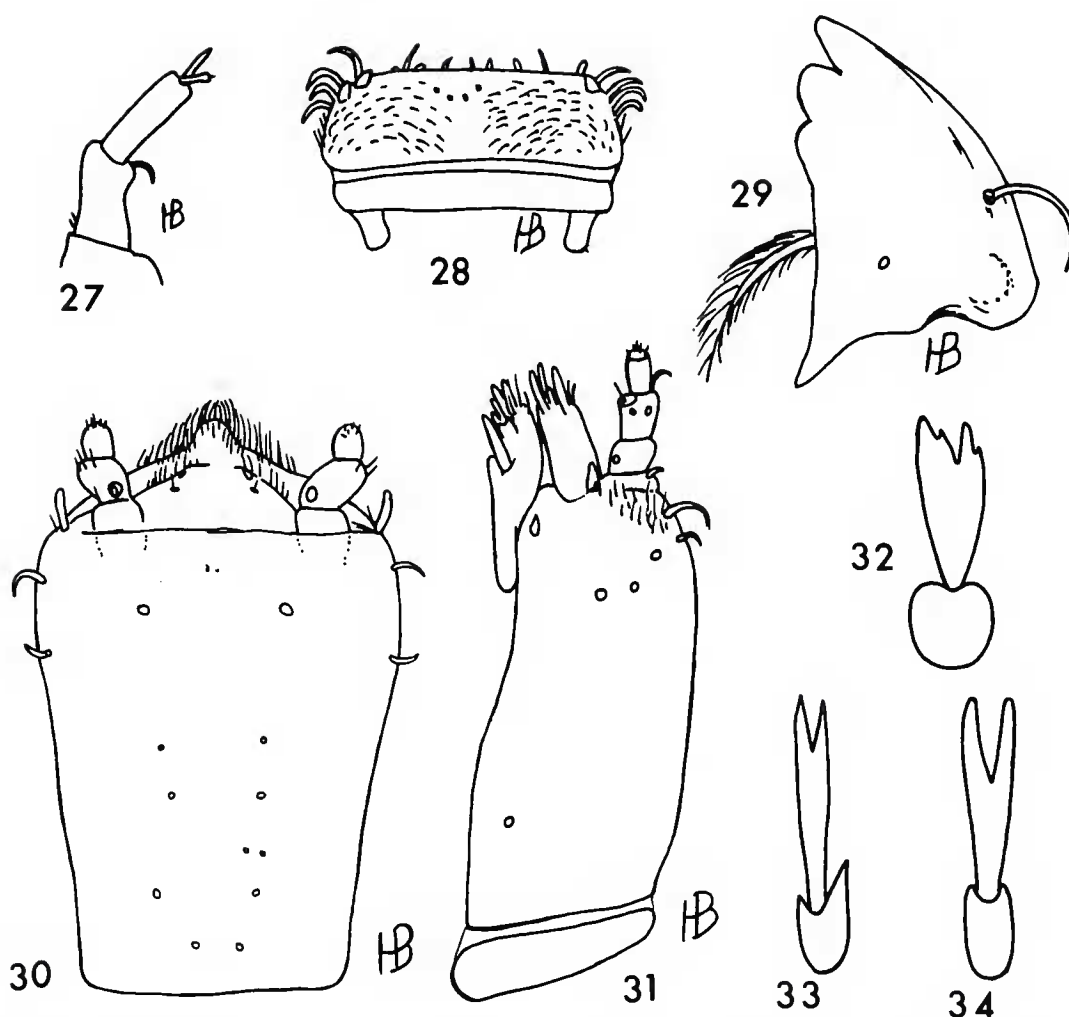
*Etymology*.—The subspecific epithet is derived from the collection site, the San Carlos River, on the San Carlos Indian Reservation.

*Habitat*.—All specimens were taken from stream rapids below a ford, less than 100 m downstream from several large warm springs. The substrate consists of sand, gravel, and rocks of considerable size. Other dryopoid beetles found in the same portion of the stream included representatives of the following genera: the dryopid *Helichus*, the psephenid *Psephenus*, and the elmids *Elsianus*, *Hexacylloepus*, and *Neoelmis*.

*Comparative notes*.—Although members of this subspecies are about the same size as those of *Huleechius marroni*, they exhibit a distinctively different appearance, with elytra conspicuously lighter in color than the pronotum. The cuticle is translucent and reminiscent of caramel, but the specimens are not teneral. From *H. spinipes*, which is opaque, they also differ in being smaller, with little trace of the conspicuous labial moustache, and without the granules studding the pronotum.

**Larvae**

The larvae of *Huleechius* have been determined not by rearing, which would be desirable, but by elimination and by association with adults under circumstances that preclude any other interpretation: 74 larvae of appropriate dimensions in a small permanent, isolated stream from which I also collected 34 adults of *Huleechius marroni* but no other larval or adult elmids. Other larvae with the same facies have also been taken from localities in which *H. spinipes* (Hinton) is relatively common, although they were mistakenly identified as probably larvae of *Elsianus* (Hinton, 1940).



Figs. 27–34. *Huleechius marroni*, n. sp., mature larva. Fig. 27. Antenna. Fig. 28. Labrum. Fig. 29. Mandible. Fig. 30. Labium. Fig. 31. Maxilla. Fig. 32. Setiferous tubercle from posterior margin of pronotum. Fig. 33. Setiferous tubercle from posterior margin of 4th abdominal sternite. Fig. 34. Setiferous tubercle from posterior margin of 4th abdominal tergite.

### Generic Characters of Larvae of *Huleechius* (Figs. 3–5, 27–34)

*Body* parallel, subcylindrical, elateriform (Figs. 3–5).

*Head* very large, exposed; anterior margin with a conspicuous tooth on each side between clypeus and base of antenna. With one ocellus on each side. Antenna (Fig. 27) 3-segmented and partially retractile; last segment setiform and small, bearing a minute terminal seta, and side by side with apical seta of second segment. Clypeus short and broad. Labrum (Fig. 28) broader than long. Mandible (Fig. 29) with 3 subacute or obtuse apical teeth; protheca long, slender, and densely spinose. Maxilla (Fig. 31) with palp 4-segmented; stipes without palpifer; galea and lacinia separate, each with apex spinose. Labium (Fig. 30) with mentum rather elongate and broadening apically; labial palp 2-segmented; prementum with a well-developed palpiger. Gula well-developed.

*Prothorax* with anterior sternite reduced to a small intercoxal sclerite which is easily overlooked; pleura obscurely divided into 2 parts, the pre-pleurites (anterior pleurites) meeting in midventral line; posterior sternite pentagonal, with anterior apex projecting acutely between procoxae; coxal cavities closed behind.

*Meso- and metathorax* each with pleura divided into 2 parts.

*Abdomen* without carinae; segments 1–7 with pleura bounded by tergo- and sternopleural sutures; segments 1–8 bordered posteriorly by tubercles bearing flat, branched setae; segment 8 forming a complete sclerotized ring; apex of segment 9 emarginate; operculum with 2 strongly sclerotized claws attached to its dorsal membrane. Anal tufts of gill filaments well-developed. Spiracles present on mesothorax and abdominal segments 1–8.

Description of Mature Larva of *Huleechius marroni*  
(Figs. 3–5, 27–34)

Length 6.0 mm; breadth 0.75 mm. Elongate, subparallel, cylindrical to hemicylindrical. Cuticle testaceous and feebly shining.

*Head* slightly broader than long (0.63:0.55 mm); posterior margin broadly and feebly emarginate; epicranial suture 0.08 mm long; frontal suture extending on each side in a subsinuate line to anterior margin above medial base of antenna; anterior margin on each side between base of clypeus and antenna with a prominent tooth subequal in length to first antennal segment. Cuticle sparsely pubescent with short, decumbent hairs arising chiefly from flattened granules; a few long, recurved hairs arise from the lateral portions of the head and longer, erect hairs (0.2 mm) are conspicuous on the ventral portion; vertex devoid of granules and setae; basal portion at level of epicranial suture rather densely covered with very small scales; anterior to level of epicranial suture the small scales are interspersed by large setiferous tubercles; toward base of antenna and marginal tooth only the larger tubercles are present. Antenna (Fig. 27) with first segment constricted laterally so that second segment articulates at a 45-degree angle; second segment subequal in length to first. Labrum (Fig. 28) with anterior margin subtruncate and bordered by recurved setae resembling curled eyelashes; angles broadly rounded; anterior angle on each side with 1 or 2 very short, toothlike setae or spines; upper surface on each side with numerous small hairs directed medially or, toward midline, posteromedially. Mandible (Fig. 29) with a single, large, recurved seta arising below middle of outer margin. Both maxilla and labium virtually devoid of hairs except near apex. Maxilla (Fig. 31) with a short, toothlike spine at lateral base of galea and another at base of lacinia. Labium (Fig. 30) with apex mammiform.

*Pronotum* with anterior angles rounded, not produced. Cuticle devoid of tubercles except near lateral margins and in a small band 2–4 tubercles in

width that extends dorsally from near anterior margin of procoxal cavity; bordered posteriorly by a row of flattened scales bearing furcate, flattened setae (Fig. 32). Meso- and metanotum rather generally covered with tubercles except in several bilaterally symmetrical patches and in a narrow band near posterior margin; bordered posteriorly by a row of flattened tubercles or scales bearing furcate, flattened setae.

*Abdomen* with tergites 1–8 even more uniformly tuberculate except for small dorsolateral and lateral bare patches symmetrically located on each segment and bordered posteriorly by flattened tubercles bearing flattened setae that are usually symmetrically branched (Fig. 34); these marginal tubercles are darker than the rest of the cuticle, forming a brownish band at the posterior margin of each segment; the projecting flat setae form a sort of collar around the intersegmental membrane and anterior portion of the succeeding segment. Segment 9 circular in cross-section; cuticle rather uniformly tuberculate except near apex; posterior margin deeply and broadly emarginate with apices acute and produced.

Ventrally, prosternite of prothorax reduced to a small, fusiform sclerite between procoxae; poststernite with apex acute and heavily sclerotized; lateral margin of coxal cavity close to lateral margin of segment; division between pre- and post-pleurite difficult to observe. Meso- and metasternum with posterior margins medially acute; cuticle uniformly tuberculate; pre-pleurites smaller than post-pleurites. Abdomen with tergopleural and sternopleural sutures convergent on each side of segment 7; sternites and pleurites uniformly tuberculate. On segment 9, operculum lacks tubercles, and is about one-third the length of the segment. All but last segment bordered posteriorly by a row of flattened tubercles bearing flat, furcate setae which are more asymmetrical toward the lateral margins (Fig. 33).

*Specimens examined*.—74 from MEXICO: Baja California Sur, Caduaño, 28/VII/73, H. P. Brown, deposited in Stovall Museum of Science and History. Some of these specimens are of earlier instars.

*Comparative notes*.—The larva of *Huleechius marroni* is very similar to that described by Hinton (1940:284) as "*Elsianus* (?) sp. ?" Since Hinton's 3 specimens upon which he based his description were collected at Temascaltepec, in the state of Mexico, where he also took adults of *Huleechius spinipes* (Hinton), it is reasonable to assume that his description pertains to the larva of *H. spinipes*. The larva of *H. marroni* differs from that of *H. spinipes* in being smaller (6.0 mm as compared with 8.5 mm), lighter in color, with the pronotal transverse belt of tubercles broader (2–4 tubercles in width rather than about 2 tubercles), and in having the mesonotum, metanotum, and abdominal tergites rather uniformly covered with tubercles. There are also other minor differences in setal and tubercular details.

Two larvae I collected 17/VIII/70 at Rancho de Carrales, about 20 km e

Cuatro Cienegas, Coahuila, presumably represent another species. One is ca. 5, the other, ca. 6 mm in length. Both are pale, with large bare patches (free of tubercles) on the mesonotum, metanotum, and posterior medial portion of abdominal tergite 1. At least the smaller, if not both larvae, would probably be immature.

I also have two larvae from South America which apparently represent species of *Huleechius*. Each is about 7 mm in length. They differ from the larva of *H. marroni* in having a greater portion of the mesonotum and metanotum devoid of tubercles and in having on each side above the spiracles on abdominal segments 1–7 a diagonal patch devoid of tubercles. One is from the Rio Piray near Santa Cruz, Bolivia, 8/XI/71 (H. P. Brown). The other is from the Rio Chanchan, Bucay, Prov. Guayas, Ecuador, 13/XI/71 (H. P. Brown). The latter specimen is much darker than the larvae of *H. marroni*. As yet, I have not detected adults of *Huleechius* from South America.

Although the larva of *Huleechius* was first described by Hinton (1940) as "*Elsianus* (?)," it is actually closer in appearance to larvae of *Stenelmis*. Fortunately, the distributional ranges of the two genera do not quite overlap. If it should turn out that they do overlap, it will probably be difficult to separate the larvae. All the true *Elsianus* larvae studied by Hinton (about 14 species by 1940) exhibit on each side of abdominal segments 2–7 an accessory longitudinal suture above what appears to be the normal tergo-pleural suture. *Huleechius* larvae lack such sutures; they are apparently unique to *Elsianus*, though in some species they occur only on segments 2–6. *Huleechius* larvae differ from those of *Stenelmis* in having the prothorax on each side with the pleuron divided into pre- and post-pleurites, though this division is difficult to see, and in possessing a vestige of the prosternite in the form of a fusiform intercoxal sclerite.

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### NOTICE

This is the last issue to be edited by T. D. Eichlin and A. R. Hardy. The new editor of *The Pan-Pacific Entomologist* will be Dr. Gordon Marsh. Manuscripts and other items of an editorial nature should be sent to the new editor:

Dr. Gordon Marsh  
Museum of Systematic Biology  
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It has been a rewarding experience serving as your editors, but all must realize that no editor can function without a great deal of help. Over the years we have had the aid of several editorial assistants, who have lightened the load. We have had an excellent working relationship with the always professional and responsive staff at Allen Press.

In our approximately four and one-half year tenure, we have processed nearly 500 manuscripts, all requiring critical review. To all of those dedicated scientists, who were willing to lend their expertise to review papers, we owe a very special debt of gratitude, because they, in large part, insure a high quality of our publication.

Finally, we want to thank the Pacific Coast Entomological Society for giving us the opportunity to serve the Society and our profession.

T. D. Eichlin, A. R. Hardy, Co-editors